



Imape

PATENT
P56533

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

JONG-SEO CHOI *et al.*

Serial No.: 09/964,375

Examiner: QUARTERMAN, KEVIN J.

Filed: 28 September 2001

Art Unit: 2879

For: CATHODE FOR ELECTRON TUBE HAVING NEEDLE-SHAPED
CONDUCTIVE MATERIAL AND METHOD OF PREPARING THE CATHODE

INFORMATION DISCLOSURE STATEMENT

Mail Stop Patent Application

Commissioner for Patents

P.O.Box 1450

Alexandria, VA 22313-1450

Sir:

In accordance with 37 C.F.R. §1.56, and §§1.97 and 1.98 as amended, Applicant cites, describes, and provides copies of the following art references:

U.S. PATENT REFERENCES:

1. U.S. Patent No. 5,990,608 to Shiroishi, entitled *ELECTRON GUN HAVING A CATHODE WITH LIMITED ELECTRON DISCHARGE REGION*, issued on 23 November 1999;
2. U.S. Patent Publication No. 2002/0041140 to Rho *et al.*, entitled *CATHODE FOR ELECTRON TUBE AND METHOD OF PREPARING THE SAME*, published on 11 April 2002;
3. U.S. Patent Publication No. 2001/0015605 to Yoshiki, entitled *CARBON FILM, FIELD EMISSION CATHODE COMPRISING THE CARBON FILM, AND*

METHOD OF MANUFACTURING THE CARBON FILM, published on 23 April 2001;

4. U.S. Patent No. 6,020,677 to Blanchet-Fincher *et al.*, entitled *CARBON CONE AND CARBON WHISKER FIELD EMITTERS*, issued on 1 February 2000; and
5. U.S. Patent No. 4,980,603 to Kimura *et al.*, entitled *CATHODE FOR AN ELECTRON TUBE*, issued on 25 December 1990.

FOREIGN PATENT REFERENCES:

1. Korean Patent Publication No. 2001-10957 to Kwon, *et al.*, entitled CATHODE FOR CRT HAVING IMPROVED CHARACTERISTIC OF UNIFORMLY EMITTING ELECTRON AND PRODUCING METHOD THEREOF, published on 15 February 2001 together with XP002273629.
2. Japanese Patent Publication No.2000-123725 to Kondo, *et al.*, entitled OXIDE CATHODE AND ITS MANUFACTURE, published on 28 April 2000 (English language Abstract is attached);
3. Japanese Patent Publication No. 11-102636 to Yamauchi, *et al.*, entitled CATHODE, MANUFACTURE OF CATHODE AND IMAGE RECEIVING TUBE, published on 13 April 1999 (English language Abstract is attached); and
4. European Patent Application No. 1 001 445 A1 to Saitoh, *et al.*, entitled CATHODE-RAY TUBE HAVING OXIDE CATHODE AND METHOD FOR PRODUCING THE SAME, published on 15 May 2000 (English language Abstract is attached).

DISCUSSION

The Shiroyoshi U.S.' 608 discusses an electron gun with a cathode discharging electrons and a plurality of grids providing apertures of full passage of electrons and guiding the passing electrons. The length of the band-shaped area that constitutes the electron dischargeable region on a shorter side is less than 80% of the diameter of the area from which the electrons are discharged when a practical maximum current is taken out without limiting the electron dischargeable region.

The Rho U.S.' 140 A1 proposes to minimize a voltage difference due to a difference in the distance between the cathode and a first grid electrode in order to improve the life and electron emission characteristics of an electron tube.

The Yoshiki U.S.'605 A1 provides a carbon film of acicular carbon in a layer and a filamentous carbon layer that covers the acicular carbon layer. The acicular carbon layer is said to comprise a plurality of conical or pyramidal shape projections, and the filamentous carbon layer is formed by at least one carbon filament not greater than 10 nanometers in filament width.

The Blanchet-Fincher U.S.'677 provides a field emitter cathode comprised of carbon whiskers, carbon cones or both carbon whiskers and carbon cones attached to a substrate that is preferably an electrical conductor. The whiskers and cones may be made by ion beam bombardment, or ion beam etching of carbon materials.

The Kimura' 603 provides a cathode for an electron tube, comprised of a base including nickel as a major element and silicon as a reducing agent, and an electron-emissive layer coating the base and including alkaline earth metal oxide containing at least barium and scandium oxide.

The Kwon KR'117 discusses an electron emitting material layer 21 formed on a base metal, with a fine electron emitting layer formed by using electron emitting material having a finer degree of fineness than the material composing the electron emitting material layer. The electron emitting layer is 60-75 micrometers while the fine electron emitting layer is 1.6 micrometers.

The Kondo *et al.* JP'725 Patent was cited in the French Search Report, as being particularly relevant if taken alone; this reference pyrolytically decomposes polymethyl methacrylate particles at a temperature lower than the carbonate particles mixed into this suspension of the carbonate particles with a particular volume ratio. Maximum particle size is set to be not more than 20 micrometers, with voids "of appropriate sizes" formed in the carbonate applied layer after heat treatment, and carbon dioxide generated when the carbonate particles are transformed into an oxide.

The Yamauchi *et al.* JP'636, also identified in the French Search Report as being particularly relevant if taken alone, relevant if taken alone, contemplates formation of an electron emitting substance layer 3 formed by spraying/applying to the flat part of the metallic base by scattering spray paste manufactured by suspending carbonate powder such as barium, strontium and calcium, in a binder such as nitrocellulose and ethyl cellulose. After drying, a surface of the electron emitting substance layer 3 is powdered under pressure by a press metal mold having a smooth surface area.

The Saitoh EP'445 Application endeavors to provide a process in which surface unevenness of an electron emissive material layer is reduced and suitable voids are formed in order to obtain a cathode ray tube exhibiting little moire and high resolution. The electron emissive layer is constituted by using two particle groups having different shapes, and by applying a process in which the shape and the material of the particle is specified.

The citation of the foregoing references is not intended to constitute an assertion that other or more relevant art does not exist. Accordingly, the Examiner is requested to make a wide-ranging and thorough search of the relevant art.

Pursuant to 37 C.F.R. §1.97(e), the undersigned attorney hereby certifies that each item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign patent application not more than three (3) months prior to the filing of the statement. Accordingly, no fee is incurred by this Statement.

No fee is incurred by this Statement.

Respectfully submitted,



Robert E. Bushnell

Reg. No.: 27,774

1522 "K" Street, N.W., Suite 300
Washington, D.C. 20005
Area Code: (202) 408-9040

Folio: P56921
Date: 26 April 2004
I.D.: REB/ny



INFORMATION CONCERNING PRIORITY STATEMENT PTO-1449 (PAGE 1 OF 1)	SERIAL NUMBER 09/964,375	DOCKET NO. P56533
	APPLICANT JONG-SEO CHOI <i>et al.</i>	
	FILING DATE 28 September 2001	GROUP 2879

U.S. PATENT DOCUMENTS							
EXAMINER	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE	
	5,990,608	11/99	Shiroishi				
	2002/0041140 A1	04/02	Rho et al.				
	2001/0015605 A1	08/01	Yoshiki				
	6,020,677	02/00	Blanchet-Fincher et al.				
	4,980,603	12/90	Kimura et al.				
FOREIGN PATENT DOCUMENTS						TRANSLATION	
	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	YES	NO
	KR 2001-0010957	02/01	KOREA			Abstract	
	JP 2000-123725	04/00	JAPAN			Abstract	
	JP 11-102636	04/99	JAPAN			Abstract	
	EP 1 001 445 A1	05/00	EUROPE			Abstract	
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)							
	French Office Action of the French Patent Application No. 02 07737 (dated 16 March 2004).						
EXAMINER:			DATE CONSIDERED:				
<small>EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP §609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</small>							